



Dart Aerospace Ltd.
1270 Aberdeen St
Hawkesbury, ON
K6A 1K7
Canada

Tel (613) 632-5200
Fax 613 632-5246

③

D350-748-243TRN
Job Sheet 195161



Part No: D350-748-243TRN

Job Qty: 1 pcs

Part Name: Crosstube Installation, High Aft



Part Weight: 0 lbs

Status: New

Priority: Medium

Job Created: 5/15/19

Job Tracking No:

Due Date: 5/29/19

Created By: Marie Lajeunesse

Type: Stock

Description:

Note: DWG REV A IPP Rev:A New Issue LL 12.05.08

Ship Via:

Bill of Materials

Job Routing

Op No	Operation	Qty	Start Date	Due Date	Standard		Workcenter/Supplier		Lead Time	DAS Sign-off
					Setup Hrs	Run Hrs	Workcenter / Supplier			
100	Mori Seiki TL-40 - 1	1 pcs	5/29/19	5/29/19	2.01	3.57	Mori Seiki TL-40 - 1			66 2019-06-12
110	QC 2	1 pcs	5/29/19	5/29/19	0.00	0.00	QC 2 - 1			9-89
							QC 2 - 12			
							QC 2 - 14			
							QC 2 - 17			
							QC 2 - 19			
							QC 2 - 2			
							QC 2 - 20			
							QC 2 - 22			
							QC 2 - 23			
							QC 2 - 25			
							QC 2 - 32			
							QC 2 - 33			
							QC 2 - 35			
							QC 2 - 39			
							QC 2 - 4			
							QC 2 - 40			
							QC 2 - 44			
							QC 2 - 45			
							QC 2 - 48			
							QC 2 - 49			
							QC 2 - 50			
							QC 2 - 51			
							QC 2 - 52			
							QC 2 - 57			
							QC 2 - 62			
							QC 2 - 63			
							QC 2 - 8			
							QC 2 - 66			66 2019-06-12
							QC 2 - 64			9-89
							QC 2 - 65			

Plex 5/15/19 8:07 AM Dart.lajeunesse.marie

5/15/2019 ,

[Dart Hawkesbury] Job Sheet - Lajeunesse, Marie

					QC 2 - 5	
					QC 2 - 71	DAS
120	Mori Seiki TL-40 - 1 - B4B	1 pcs	5/29/19	0.00 3.57	Mori Seiki TL-40 - 1 - B4B	662019-06-17
130	QC 2	1 pcs	5/29/19	0.00 0.00	QC 2 - 1	9-89
					QC 2 - 12	
					QC 2 - 14	
					QC 2 - 17	
					QC 2 - 19	
					QC 2 - 2	
					QC 2 - 20	
					QC 2 - 22	
					QC 2 - 23	
					QC 2 - 25	
					QC 2 - 32	
					QC 2 - 33	
					QC 2 - 35	
					QC 2 - 39	
					QC 2 - 4	
					QC 2 - 40	
					QC 2 - 44	
					QC 2 - 45	
					QC 2 - 48	
					QC 2 - 49	
					QC 2 - 50	
					QC 2 - 51	
					QC 2 - 52	
					QC 2 - 57	
					QC 2 - 62	
					QC 2 - 63	
					QC 2 - 8	
					QC 2 - 66	
					QC 2 - 64	
					QC 2 - 65	
					QC 2 - 5	
					QC 2 - 71	
140	QC 8	1 pcs	5/29/19	0.00 0.00	QC 8 - 12	
					QC 8 - 14	
					QC 8 - 17	
					QC 8 - 20	
					QC 8 - 25	
					QC 8 - 3	
					QC 8 - 32	
					QC 8 - 33	
					QC 8 - 35	
					QC 8 - 39	
					QC 8 - 4	
					QC 8 - 44	
					QC 8 - 45	
					QC 8 - 49	
					QC 8 - 58	
					QC 8 - 8	
					QC 8 - 9	
					QC 8 - 68	
					QC 8 - 67	
					QC 8 - 1 (A)	
					QC 8 - 47	
					QC 8 - 40	
					QC 8 - 52	
					QC 8 - 23	

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150	Crosstubes - 2 - B4B	1 pcs	5/29/19	0.00 0.81	Crosstubes - 1 - B4B	
					Crosstubes - 2 - B4B	
					Crosstubes - 3 - B4B	
					Crosstubes - 4 - B4B	
190	Packaging 3-1 - Stock - B4B	1 pcs	5/29/19	0.00 0.00	Packaging 3 - 1 - B4B	
					Packaging 3 - 2 - B4B	
					Packaging 3 - 3 - B4B	
					Packaging 3 - 4 - B4B	
					Packaging 3 - 5 - B4B	
					Packaging 3 - 6 - B4B	
					Packaging 3 - 7 - B4B	
					Packaging 3 - 8 - B4B	
					Packaging 3 - 9 - B4B	
					Packaging 3 - 10 - B4B	
					Packaging 3 - 11 - B4B	
					Packaging 3 - 12 - B4B	
					Packaging 3 - 13 - B4B	
					Packaging 3 - 14 - B4B	
					Packaging 3 - 15 - B4B	
					Packaging 3 - 16 - B4B	
					Packaging 3 - 17 - B4B	
					Packaging 3 - 18 - B4B	
					Packaging 3 - 19 - B4B	
					Packaging 3 - 20 - B4B	
					Packaging 3 - 21 - B4B	
					Packaging 3 - 22 - B4B	
					Packaging 3 - 23 - B4B	
					Packaging 3 - 24 - B4B	
					Packaging 3 - 25 - B4B	
					Packaging 3 - 26 - B4B	
					Packaging 3 - 27 - B4B	
					Packaging 3 - 28 - B4B	
					Packaging 3 - 29 - B4B	
					Packaging 3 - 30 - B4B	
					Packaging 3 - 31 - B4B	
					Packaging 3 - 32 - B4B	
					Packaging 3 - 33 - B4B	
					Packaging 3 - 34 - B4B	
					Packaging 3 - 35 - B4B	
					Packaging 3 - 36 - B4B	
200	QC 21 - SA	1 pcs	5/29/19	0.00 0.00	QC 21 - SA - 21	
					QC 21 - SA - 70	
					QC 21 - SA - 53	

Part Op **100** - TL-40 (Mori Seiki CNC Lathe Large) 1-Cut tube on chop saw, leave extra mat'l for facing and install plugs 350-241
 Descriptions: on both ends. 2-Face both sides of tube. 3- Turn program 02000 section on both side as per folio FB468. 4- Turn program 03000 section on both side as per folio FB468. 5- Blend transsition lines only with belt sander 60 grit. Folio rev: A Dwg rev: A
110 - (QC2- Inspect parts off machine FAI/FAIB)
120 - TL-40 (Mori Seiki CNC Lathe Large) 1- Turn program 04000 section on both side as per folio FB468. 2- Turn program 05000 section on both side as per folio FB468. 3- Blend transsition lines only with belt sander 60 grit. 4-Scribe part # as per Dwg D350-748-243. Folio rev: A Dwg rev: A
130 - (QC2- Inspect parts off machine FAI/FAIB) PERFORME ULTRASONIC MEASUREMENT
140 - (QC8- Inspect parts - second check)
150 - Crosstubes-2 (Crosstubes) 1-Grind machining marks
190 - Identify and stock in kanban rack
200 - (QC21- Final Inspection - Work Order Release)

Job BOM

Part / Item	Component Name	Quantity	Operation	Container
D6021-125	Crosstube Material - 17-4Ph SS	1 pcs (1 ea)	100-Mori Seiki TL-40 - 1	F151691

Job Allocations				
Operation	Component Part	Required	Inventory	Allocated
100-Mori Seiki TL-40 - 1	D6021-125	1	39	0
Part Specifications				
Specifications could not be found.				

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Container No: S189668



Part: D350-748-243TRN

Job No: 195161

Serial No/Batch: S189668

Revision: A

Inspector:

Exp Date:

Instructions:

Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
CANADA
TEL.: 1 613 632-5200
Email: sales@dartaero.com
www.dartaerospace.com

Date: 06/12/19

③

DART AEROSPACE LTD	Work Order:	195/61
Description: Crosstube Assembly (AS350/355 High Aft SS)	Part Number:	D350-748-243
Inspection Dwg: D350-748-243 Rev: A		Page 1 of 2

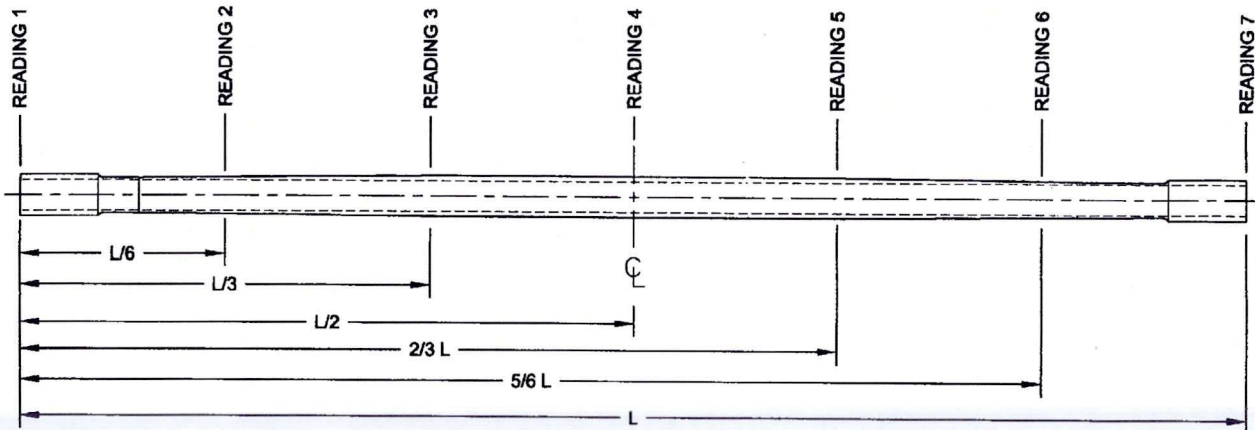
FIRST ARTICLE INSPECTION CHECKLIST

	Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.240	+/-0.005	2.236		✓	CNC-04 ↓	
	2.180	+0.005/-0.000	2.177		✓		
	2.180	+0.005/-0.000	2.176		✓		
	2.208	+0.005/-0.000	2.202		✓		
	2.234	+0.005/-0.000	2.234	✓			
	2.253	+0.005/-0.000	2.249		✓		
	2.272	+0.005/-0.000	2.277	✓			
	2.299	+0.005/-0.000	2.304	✓			
	0.063	+/-0.010					
	5.25	+/-0.060					
	R0.063	+/-0.010					
	R0.50	+/-0.030					
SIDE B	2.240	+/-0.005	2.243	✓		CNC-04 ↓	
	2.180	+0.005/-0.000	2.184	✓			
	2.180	+0.005/-0.000	2.183	✓			
	2.208	+0.005/-0.000	2.207		✓		
	2.234	+0.005/-0.000	2.224		✓		
	2.253	+0.005/-0.000	2.253	✓			
	2.272	+0.005/-0.000	2.276	✓			
	2.299	+0.005/-0.000	2.304	✓			
	0.063	+/-0.010					
	5.25	+/-0.060					
	R0.063	+/-0.010					
	R0.50	+/-0.030					
	124.70	+/-0.060	124.71	✓		Tape	

3

DART AEROSPACE LTD		Work Order: 195/61
Description: Crosstube Assembly (AS350/355 High Aft SS)		Part Number: D350-748-243
Inspection Dwg: D350-748-243 Rev: A		Page 2 of 2

WALL THICKNESS MEASUREMENT



Location	WALL THICKNESS MEASUREMENT (IN)				Deviation Δw (max-min)	TOLERANCE
	w1	w2	w3	w4		
READING 1 L= 0"						0.030"
READING 2 L= 20.78						
READING 3 L= 41.57						
READING 4 L= 62.35						
READING 5 L= 83.13						
READING 6 L= 103.92						
READING 7 L= 124.70						

Calibration Result

Actual Block Thickness: 100-200

Sitescan 250 Measured Thickness: _____

Measured by:		Audited by:		Preliminary Approval:	
Date:		Date:		Date:	

Rev	Date	Change	Revised by	Approved
A	15.09.09	New Issue (P/O D350-748-203)	KJ	

Item	Qty	Part Number	Description
	-243		
1	X	D350-748-243	CROSSTUBE ASSEMBLY (AS 350/355 HI AFT)
2	1	D6021-125	CROSSTUBE
3	2	D3502-1	SUPPORT
4	2	D5123-7	CLAMP CUSHION
5	1	AETC-1032	INSERT
6	2	MS21920-20 OR MS21920-21/-22	CLAMP (PER DART SPEC. M-MS21920-20/-21/-22)
7	1	NAS1149C0363R	WASHER (OR AN960C10)
8	1	NAS1635-3-8	SCREW (OR MS51958-63)
9	AVR	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6021-125
FINISHED LENGTH AFTER TURNING = 124.70±0.06 (AFTER BENDING/TRIMMING = 122.70 REF)
- 2) FINISH: PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCE: PER DART QSI 018 UNLESS OTHERWISE NOTED.
WALL THICKNESS ECCENTRICITY PER DART QSI 038 7.2
MIN. ALLOWABLE WALL IS -0.020 FROM NOMINAL
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: DART PART NUMBER "D350-748-243" AND BATCH NUMBER ON INSIDE OF CUFF
PER DART QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 29.85 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.290 HOLE.
- 9) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.

TURNING

- 10) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER BENDING.

BENDING

- 11) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES PER SIDE. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 8% BASED ON O.D. ON TOP HALF OF BEND, AND 8% ON BOTTOM HALF OF BEND.
- 12) MAX AMPLITUDE OF RIPPLING ALONG BENT PORTION OF THE TUBE IS 0.030 (ZN A1-3)
- 13) MAX TWIST: WITH XTUBE LAYED FLAT ON SURFACE, THE DIFFERENCE BETWEEN CUFF HEIGHTS FROM THE SURFACE MAY BE NO LARGER THAN 0.38 (ZN C1-3).

ASSEMBLY

- 14) TO INSTALL D3502-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.02" TO 0.05" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 15) TORQUE CLAMPS 80 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 195161 M15
19-05-11

DEO ATTACHED

RELEASED

2015 MAR 18

RELEASED

2015 MAR 18

UNDER REVIEW

15/4/16
CRF 15/5/16

CK
16/2/25

A	NEW ISSUE	CP	15.01.21
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN			
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	15.01.21		

DART AEROSPACE LTD
HAWKESBURY, ONTARIO, CANADA

DRAWING NO. D350-748-243
REV. A
SHEET 1 OF 4

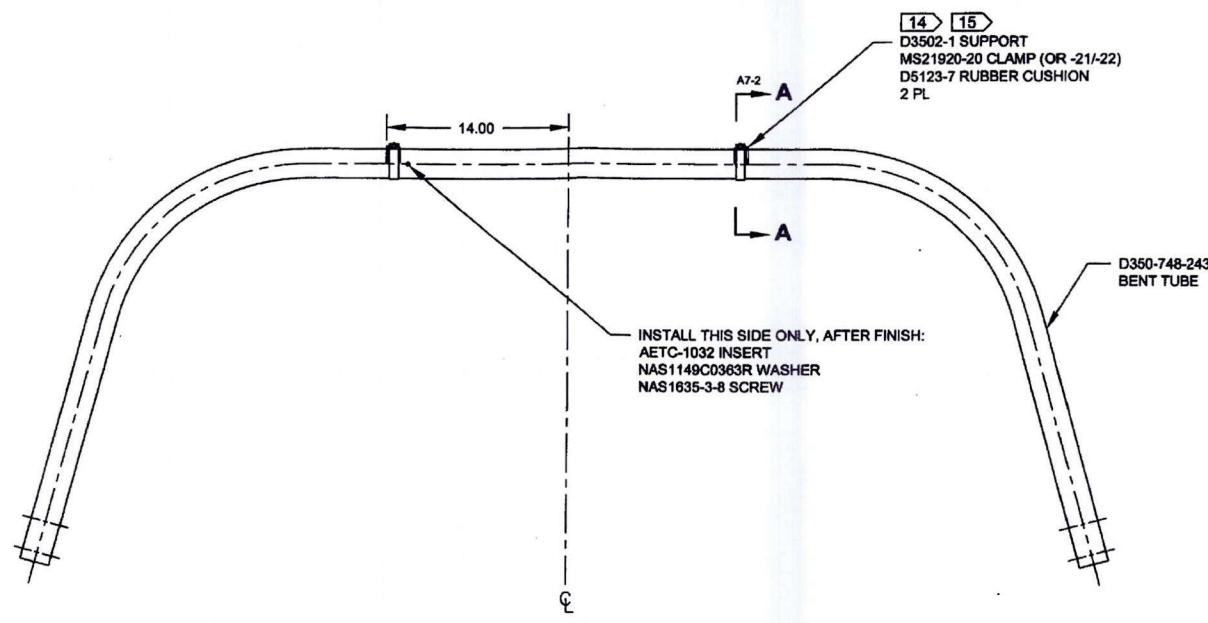
TITLE CROSSTUBE (AS 350/355 HI AFT)
SCALE NTS

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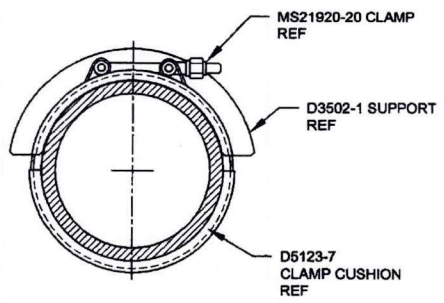
8 7 6 5 4 3 2 1

D
C
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**D350-748-243
ASSEMBLY DETAIL**



SECTION A-A D4-2
SCALE 6X

DEO ATTACHED

RELEASED

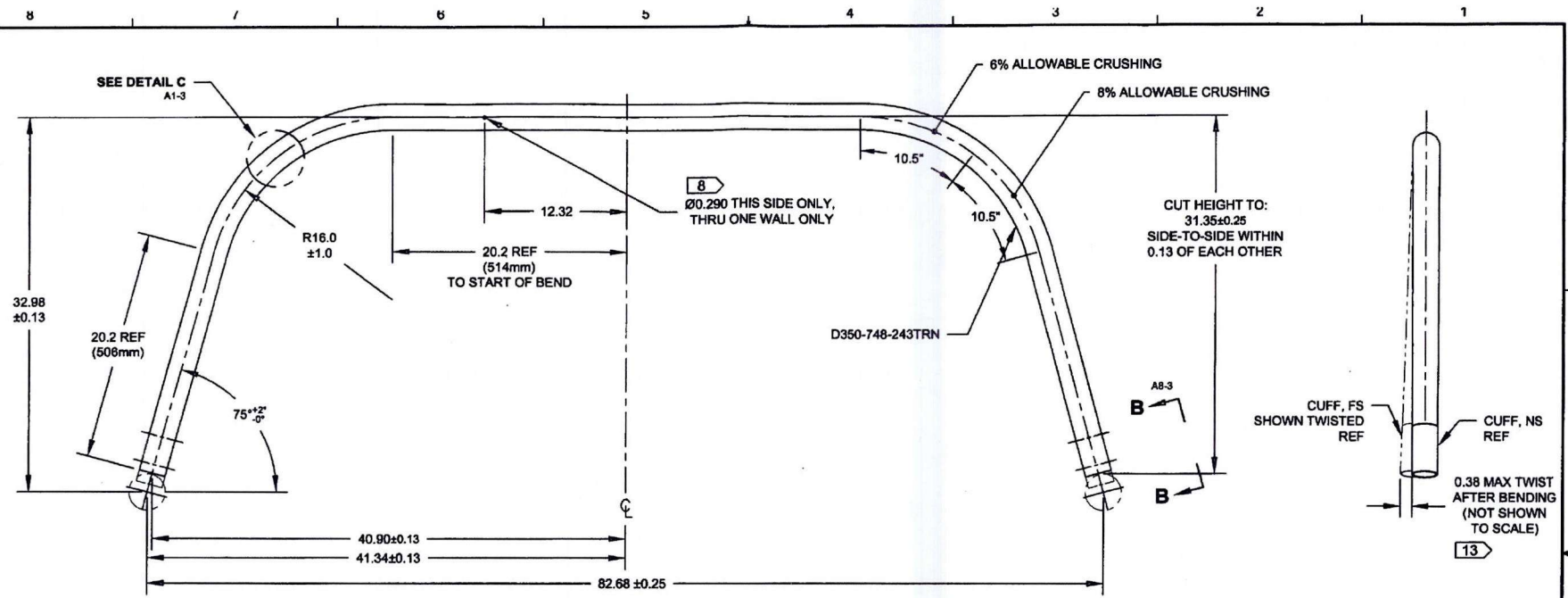
UNDER REVIEW

15/1/21
9/16/21

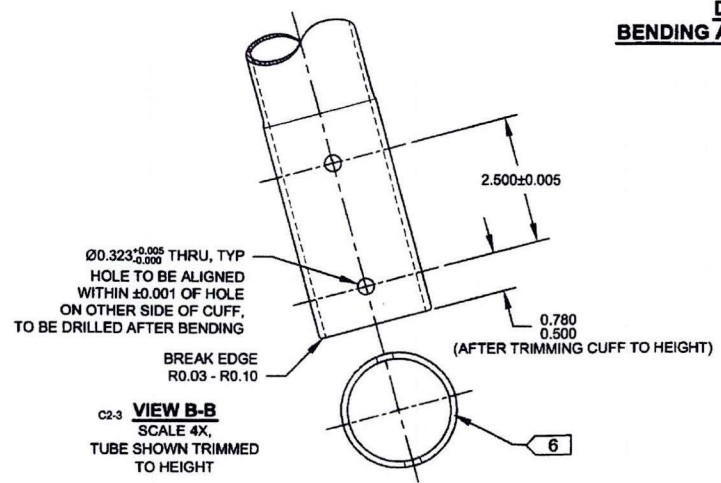
2015 MAR 18

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DRAWN	40	HAWKESBURY, ONTARIO, CANADA	
CHECKED	A.P.	DRAWING NO.	REV. A
MFG. APPR.	7/4/21	D350-748-243	SHEET 2 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE (AS 350/355 HI AFT)	NTS
DATE	15.01.21	COPYRIGHT © 2015 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESSED CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD	

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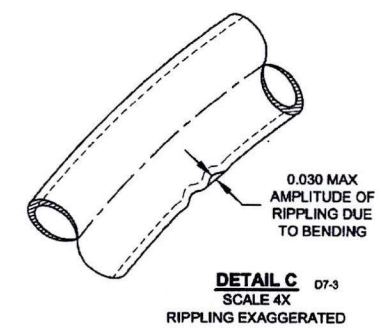


D350-748-243
BENDING AND DRILLING DETAIL 11

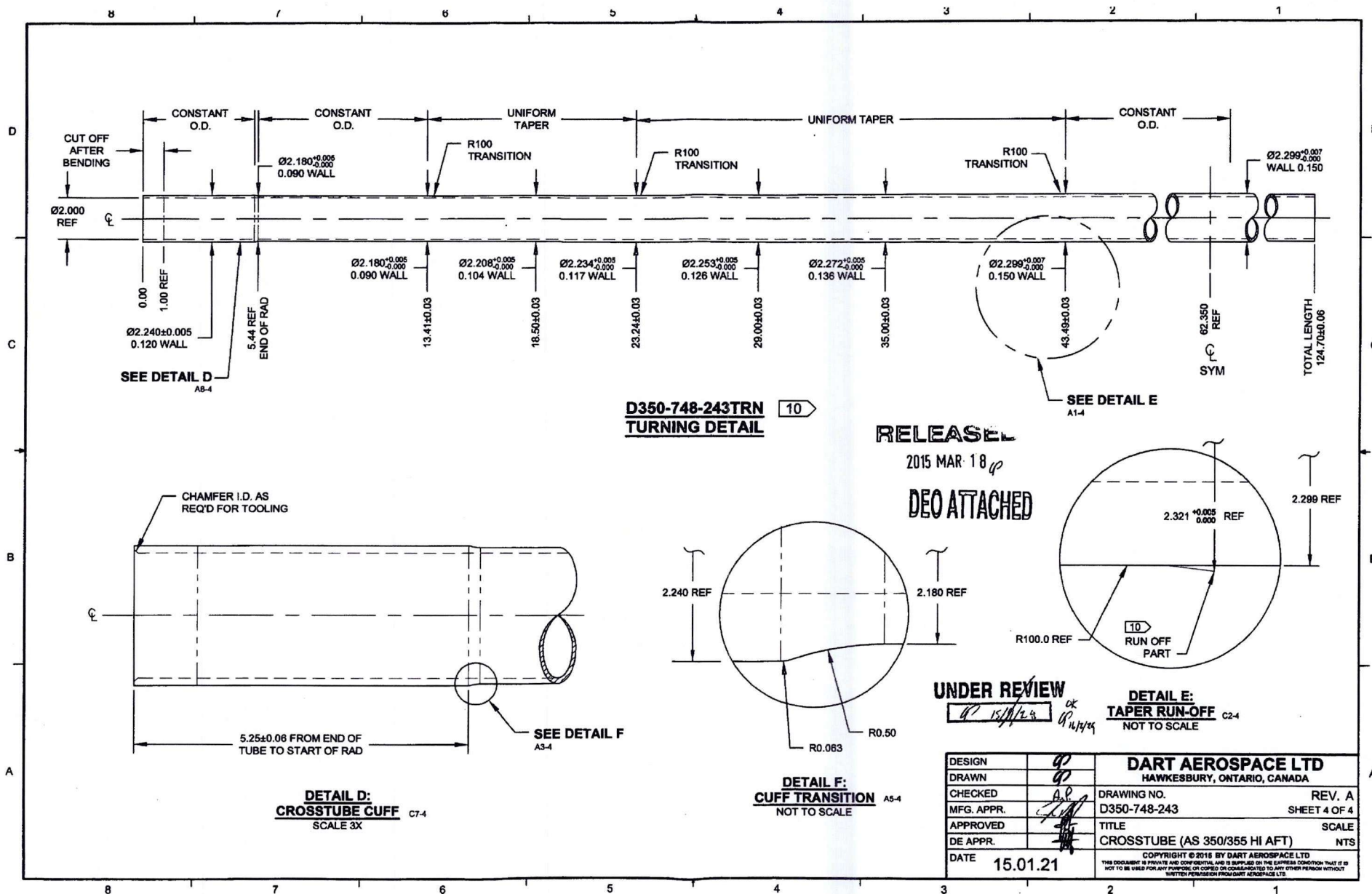


DEO ATTACHED
 RELEASED
 2015 MAR 18

UNDER REVIEW
 15/14/20 OK 4/6/20



DESIGN	90	DART AEROSPACE LTD	
DRAWN	90	HAWKESBURY, ONTARIO, CANADA	
CHECKED	A.P.	DRAWING NO.	REV. A
MFG. APPR.	704	D350-748-243	SHEET 3 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE (AS 350/355 HI AFT)	NTS
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DRAWING NO. D350-748-243	TITLE CROSSTUBE	REV. A	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D350-748-243-A-1	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN <i>qp</i>	CHECKED <i>ASS</i>	MFG. APPR. <i>[Signature]</i>	APPROVED <i>[Signature]</i>		DE APPR. <i>[Signature]</i>		
DATE 15.11.18	DATE 15.11.18	DATE 16.02.19	DATE FEB 19 2016		DATE 2016.02.19		

AMEND NOTE 2 (SHEET 1) AS FOLLOWS:

- 2) FINISH: PREPARE SURFACE PER DART QSI 005 4.1.4
 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
 PAINT OUTSIDE PER DART QSI 005 4.2
 OR
 POWDER COAT WHITE (4.3.5.2) PER DART QSI 005 4.3

RELEASED
 2016-02-26
 EN 16-534 *[Signature]*

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Entered: _____ Date: _____



WORK ORDER NON-CONFORMANCE / ROUTE UPDATE

NCR No. _____

Route update only ☐

Job: <u>195161</u> Part No: <u>D380-748-2431AN</u>		DISPOSITION Rework ☐ Scrap ☒ Use-as-is ☐		DEPARTMENT/PROCESS <table style="width:100%;"> <tr> <td>Skid-tube ☐</td> <td>Cross tube ☒</td> <td>Eng. (Non-AW) ☐</td> <td>Engineering ☐</td> </tr> <tr> <td>Machining ☐</td> <td>Small Fab ☐</td> <td>Prod. Eng. Coord. ☐</td> <td>Water Jet ☐</td> </tr> <tr> <td>Large Fab ☐</td> <td>Finishing ☐</td> <td>Rec/Store/Packaging ☐</td> <td>Supplier Quality ☐</td> </tr> </table>				Skid-tube ☐	Cross tube ☒	Eng. (Non-AW) ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Water Jet ☐	Large Fab ☐	Finishing ☐	Rec/Store/Packaging ☐	Supplier Quality ☐																
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Date : <u>2019-06-17</u>		Sequence #: <u>130 QC2</u>		QTY Affected : <u>1</u>		MRB (QSI042)																													
Description Work Order Deviation				Disposition																															
<u>Under size due to deviation of offset</u>				<u>SCRAP</u>																															
				Completed By <u>DAS 66</u> <u>9-89</u>																															
				Lead hand / Supervisor <u>[Signature]</u> <u>19-06-19</u>																															
				QC / QA Coordinator <u>DAS 68</u> <u>9-89</u> <u>JUN 19 2019</u>																															
Root Cause Operator ☒ Manufacturing Process ☐ Equip/Tooling ☐ Handling/Presservation ☐ Material ☐ Product Improvement ☐ Process Improvement ☐ Human Factors ☐		FAULT CATEGORY <table style="width:100%;"> <tr> <td>☐ Pressure/Forced</td> <td>☐ Contamination</td> <td>☐ Power Loss/Surge</td> <td>☐ Positioned Wrong</td> </tr> <tr> <td>☐ Bending</td> <td>☐ Misaligned/off center</td> <td>☐ Folio/Program</td> <td>☐ Outside Tolerance</td> </tr> <tr> <td>☐ Crushing</td> <td>☐ BOM/Route</td> <td>☐ Grain Direction</td> <td>☐ Drawing</td> </tr> <tr> <td>☐ Cracks</td> <td>☐ Broken/Damage/Defect</td> <td>☐ Weld</td> <td>☐ Finish</td> </tr> <tr> <td>☐ Crimp/Kink/Ripple/Wave/Twist</td> <td>☐ Incomplete/Unclear Instructions</td> <td>☐ Wrong Stock Pulled</td> <td>☐ Part Lost/Missing</td> </tr> <tr> <td>☐ Marks/Chatter</td> <td>☐ Drill Holes</td> <td>☐ Out of Sequence</td> <td>☐ Misread</td> </tr> <tr> <td>☐ Mislabeled</td> <td>☐ Fit/Function</td> <td>☒ Off-set/Set-up</td> <td></td> </tr> </table>						☐ Pressure/Forced	☐ Contamination	☐ Power Loss/Surge	☐ Positioned Wrong	☐ Bending	☐ Misaligned/off center	☐ Folio/Program	☐ Outside Tolerance	☐ Crushing	☐ BOM/Route	☐ Grain Direction	☐ Drawing	☐ Cracks	☐ Broken/Damage/Defect	☐ Weld	☐ Finish	☐ Crimp/Kink/Ripple/Wave/Twist	☐ Incomplete/Unclear Instructions	☐ Wrong Stock Pulled	☐ Part Lost/Missing	☐ Marks/Chatter	☐ Drill Holes	☐ Out of Sequence	☐ Misread	☐ Mislabeled	☐ Fit/Function	☒ Off-set/Set-up	
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☐ Mislabeled	☐ Fit/Function	☒ Off-set/Set-up																																	
		Other/Details:																																	